



Maintaining Air Filters & Other Priorities

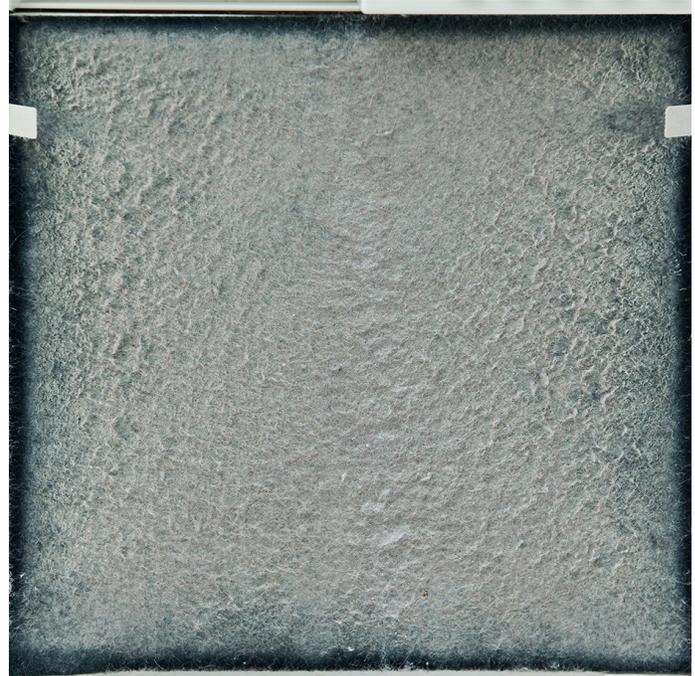
By Howard McKew, P.E., C.P.E.

Maintaining air filter cleanliness throughout the year is a facility management balancing act. Facility managers want to maximize the filter useful service life, based on manufacturer's recommendations, while replacing these filters at the optimum time to avoid excessive supply fan motor electrical energy. There are some facilities that simply change their air filters quarterly or semi-annually. Air filtration is not a quarterly or semi-annual occurrence. There are 4-seasons to the year and each season can have an impact on air filters.

Spring is probably the most challenging season for air filter management. During this season comes tree pollen in the air. Depending on the outdoor surroundings, as well as the run-hours of central air-handling unit(s) operation, filters can become "overloaded" with pollen within a couple of weeks. This "overloading" can be especially true for a central air-handling unit that has an automatic temperature control (ATC) sequence of operation that includes airside economizer A.K.A. free cooling.

Airside economizer sequence of operation occurs when the outdoor air temperature is between 60F+/- or less. During these outdoor temperature periods, the ATC sequence will blend a steady flow of outdoor air with return air to deliver 55F-60F supply air to the building. With this "free cooling", the mechanical refrigeration system, serving the central air-handling unit and designed to provide 55F-60F supply air, can be off thus saving electrical energy. This means, that at 55F-60F outdoor air, the air-handler is introducing 100% outdoor, pollen laden air to the unit's filters!

This outdoor air quantity will progressively be reduced as the temperature drops until the unit ATC sequence reaches the "outdoor minimum air" set point. If the quarterly or semi-annual filter change out isn't scheduled to be changed again for 3-months or 6-months, these filters will be "loaded" with pollen dust and often will exceed the manufacturer's recommended



time to replace them. The results will be excessively dirty filters, possible reduction in central air-handling supply air volume, and possibly an increase in supply air fan electrical energy consumption.

For more on air filter discussion, please refer to the following *Focus on Facilities* columns:

Facility Management columns:

[More Pollen = More Air Filter Changes \(June 2019\)](#)

[What Filter Rating Best Suits Your Building? \(July 2019\)](#)

Asset Management columns:

[Indoor Air Quality and Indoor Environmental Quality for Your Building \(August 2021\)](#)

When it comes to indoor air quality, facility management of the air filters serving the building's central air systems, the amount of outdoor ventilation

and the ability to maintain an equal or positive air pressure in the building is very important to occupant health and space comfort.

Facility managers should budget bi-annually, if not annually to have air balance readings for all outdoor air units, as well as exhaust air units to ensure that adequate outdoor air ventilation is being maintained in the building. Occupants need filtered outdoor air based on State Building Code. The amount of outdoor air will be based on one of the following:

- Cubic feet per minute (CFM) per person, e.g., 10 CFM per person
- Percentage of air changes in the space e.g., total of 6-air changes for the room application with 2-air changes being outdoor air and 4-air changes being return air
- Specific CFM outdoor air to CFM exhaust air, e.g., 1,000 CFM outdoor air to 900 CFM exhaust air for the room application
- Specific CFM outdoor air to CFM exhaust air, e.g., 12,000 CFM outdoor air to 11,000 CFM exhaust air for the overall floor supply air-to-exhaust air application

Note: Each floor, as well as the overall building should be engineered and air balanced to maintain building pressure at “equal” or slightly “positive” pressure to avoid the risk of a facility being under “negative” pressure resulting in outdoor air being drawn into the building unfiltered and creating cold air draft during the winter months.

With the outbreak of COVID-19 in the United States, outdoor ventilation quantities were often increased in schools, as well as other facility applications to assist in improving occupant health because of the airborne concerns within a building. The American Society of Heating, Refrigerating, and Air-Conditioning Engineering (ASHRAE) has produced a series of useful documents for building owners and facility managers including the following:

[**In-Room Air Cleaner Guidance for Reducing Covid-19 In Air In Your Space/Room**](#)

[**Core Recommendations for Reducing Airborne Infectious Aerosol Exposure**](#)

[**One Page Guidance for Re-Opening Buildings**](#)

[**One Page Guidance for Residential Buildings**](#)

[**One Page Guidance for Reopening Schools**](#)

[**Environmental Health Emerging Issue Brief Pandemic COVID-19 and Airborne Transmission**](#)

[**Guidance from Environmental Protection Agency \(EPA\): Indoor Air and Coronavirus \(COVID-19\)**](#)

Also, please read this month’s *Focus on Facilities*, Asset Management column for more on occupant health in schools, healthcare facilities, and other building applications.

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